**LPDES PERMIT NO. LA0004847, AI No. 2532**

**LPDES FACT SHEET and RATIONALE**
FOR THE DRAFT LOUISIANA POLLUTANT DISCHARGE ELIMINATION SYSTEM
(LPDES) PERMIT TO DISCHARGE TO WATERS OF LOUISIANA

I. **Company/Facility Name:** Mosaic Fertilizer, LLC
Uncle Sam Plant
Highway 44
Uncle Sam, LA 70792

II. **Issuing Office:** Louisiana Department of Environmental Quality
(LDEQ)
Office of Environmental Services
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

III. **Prepared By:** Bruce Fielding
Industrial Permits Section
Water Permits Division
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**Date Prepared:** December 10, 2009

IV. **Permit Action/Status:**

A. Reason For Permit Action:

Proposed reissuance of an expired Louisiana Pollutant Discharge Elimination System (LPDES) permit for a 5-year term following regulations promulgated at LAC 33:IX.2711/40 CFR 122.46.

LAC 33:IX Citations: Unless otherwise stated, citations to LAC 33:IX refer to promulgated regulations listed at Louisiana Administrative Code, Title 33, Part IX.

40 CFR Citations: Unless otherwise stated, citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations in accordance with the dates specified at LAC 33:IX.2301.F, 4901, and 4903.

B. LPDES permit -
LPDES permit effective date: November 1, 2003
LPDES permit modification effective: February 1, 2005
LPDES permit modification effective: November 1, 2005
LPDES permit expiration date: October 31, 2008
EPA has not retained enforcement authority.

C. Application received on May 5, 2008 and emails from Mosaic (Chatelain) to LDEQ (Loyd) received on December 16 and 18, 2009.

Additional information received in an email from Mosaic (Chatelain) to LDEQ (Fielding) 2/23/2010 and 4/1/2010.

**V. Facility Information:**

A. Location - Louisiana Highway 44 in Uncle Sam, St. James Parish

B. Applicant Activity - According to the application, Mosaic Fertilizer, LLC, Uncle Sam Plant, is a phosphatic fertilizer manufacturing plant. Products manufactured onsite include sulfuric acid, phosphoric acid, and fluorosilicic acid (FSA).

C. Technology Basis - (40 CFR Chapter 1, Subchapter N/Parts 401-402, and 401, 405-415, and 417-471 have been adopted by reference at LAC 33:IX.4903)

Regulations promulgated at 40 CFR 122.44(a)/LAC 33:IX.2707.A require technology-based effluent limitations to be placed in LPDES permits based on effluent limitation guidelines where applicable, on Best Professional Judgement (BPJ) in the absence of guidelines, or on a combination of the two. Effluent guidelines at 40 CFR 418.13 were rescinded for phosphoric acid plants located in the southern delta of the Mississippi River. The guidelines essentially require no discharge of process pollutants. Excess stormwater may be discharged after treatment, provided the permittee maintains a water circulation system designed, constructed, and operated to maintain a surge capacity equal to the runoff from a 10-year, 24-hour rainfall event whenever chronic or catastrophic precipitation events cause the water level to rise into the surge capacity.

The technology on which the guidelines were based was developed in Florida, where high gypsum stacks collect relatively small amounts of contaminated stormwater. In southern Louisiana, the soil is soft, and gypsum stacks cannot attain sufficient height to collect rainfall over a small area. As a result, the collected rainfall is so large that it cannot be recycled back to the process to achieve the discharge provisions of 40 CFR 418.12(a).

Previous permit requirements for phosphate fertilizer plants were based on BPJ. Plants were allowed to designate a portion of the stacks as inactive, and the stormwater collected from these stacks could be discharged to the river under controlled discharge conditions governed by water quality standards at the time of implementation. This approach is carried forward in this draft permit. The guideline technology is applied to the active section of the plant by BPJ, as in the previous permit.

The Uncle Sam Facility was constructed prior to the guidelines, the cooling system was not protected with corrosion-resistant materials, and retrofitting to recycle cooling water would require extensive capital. The facility was granted a Fundamentally Different Factors (FDF) Variance from the guidelines so it could continue to use once-through barometric cooling water. Part of the FDF agreement was that the company install and use swift towers to collect fluoride from the evaporator overhead section.

Other sources of technology based limits:
LDEQ Stormwater Guidance, letter dated 6/17/87, from J. Dale Givens (LDEQ) to Myron Knudson (EPA Region 6).
LDEQ Sanitary General Permits
Best Professional Judgement
Previously effective LPDES permit

D. Fee Rate -
1. Fee Rating Facility Type: Major
2. Complexity Type: VI
3. Wastewater Type: II
4. SIC code: 2874 and 2819

E. Continuous Facility Effluent Flow (Max 30-Day) - 172.3 MGD.

**VI. Receiving Waters**: Mississippi River (Final Outfall 001) and Bayou des Acadiens thence into Blind River (Final Outfalls 105, 205, and 305)

Mississippi River (Final Outfall 001):
1. TSS (15%), mg/L: 32
2. Average Hardness, mg/L $CaCO_3$: 153.4
3. Critical Flow, cfs: 141,955
4. Mixing Zone Fraction: 1/3
5. Harmonic Mean Flow, cfs: 366,748
6. River Basin: Mississippi River, Subsegment No. 070301
7. Designated Uses:
   The designated uses are primary contact recreation, secondary contact recreation, and fish and wildlife propagation.

Blind River via Bayou des Acadiens (Final Outfalls 105, 205, and 305) (*1):
1. River Basin: Lake Pontchartrain, Subsegement No. 040401
2. Designated Uses:
   The designated uses are - primary contact recreation, secondary contact recreation, fish and wildlife propagation, and outstanding natural resource waters.

(*1) Final Outfalls 105, 205, and 305 are stormwater outfalls that do not receive water quality-based effluent limits.

Information based on the following: LAC 33:IX Chapter 11;/Recommendation(s) from Todd Franklin to Sonja Loyd, November 19, 2009. Hardness and 15% TSS data come from monitoring station 0319 on the Mississippi River listed in Hardness and TSS Data for All LDEQ Ambient Stations for the Period of Record as of March 1998, LeBlanc. See Appendix A.

**VII. Outfall Information:**

Final Outfall 001

A. Type of wastewater (*1) - Once-through barometric cooling water, fume scrubber water, and utility wastewater (via Internal Outfalls 101 and 201), phosphate fertilizer area non-process wastewater and process area stormwater (via Internal Outfall 301); and discharges from Internal Outfall 002, which includes the following internal outfalls: once through cooling water from the sulfuric acid plant (via Internal Outfalls 102 and 202), power plant utility wastewater (via Internal Outfall 302), clarifier underflow (via Internal Outfall 402), and treated sanitary wastewater (via Internal Outfall 502).

(*1)Note: Internal Outfalls 003 and 004 also physically discharge through Final Outfall 001, but are regulated separately except for biomonitoring.

B. Location - combined final discharge prior to combining with the Mississippi River at Latitude 30°02'21", Longitude 90°49'51".

C. Treatment - Only Internal Outfall 502 is treated, see below.

D. Flow - Continuous, (LTA) 140.48 MGD (Max 30-Day) 172.3 MGD

E. Receiving waters - Mississippi River

F. Basin and segment - Mississippi River Basin, Subsegment 070301

Internal Outfall 101 - This is not a physical discharge location. It is identified only for purposes of an FDF variance.

A. Type of wastewater - Once-through barometric cooling water, fume scrubber water, filtrate sump overflow, reagent tank condensate, N&S evaporator hotwell overflow, vacuum pump seal water and scrubber overflow, and evaporator condensate dump line.

B. Location - Discharge to the Mississippi River via Final Outfall 001 at Latitude 30°02'23", Longitude 90°49'41".

C. Treatment - none

D. Flow - Continuous, (LTA) 43.2 MGD

E. Receiving waters - Mississippi River via Final Outfall 001

F. Basin and segment - Mississippi River Basin via Final Outfall 001, Subsegment 070301

Internal Outfall 201 - This is not a physical discharge location. It is identified only for purposes of an FDF variance.

A. Type of wastewater - Once through contact cooling water and fume scrubber water, vacuum pump seal water, filtrate sump overflow, N&S barometric seal tank overflow, N&S fume scrubber and fan water, N&S #9 Attack Tank cell overflow and vacuum pump scrubber water.

B. Location - Discharge to the Mississippi River via Final Outfall 001 at Latitude 30°02'21", Longitude 90°49'41".

C. Treatment - none

D. Flow - Continuous, (LTA) 21.6 MGD

E. Receiving waters - Mississippi River via Final Outfall 001

F. Basin and segment - Mississippi River Basin via Final Outfall 001, Subsegment 070301

Internal Outfall 301 - This is not a physical discharge location. It is a collection of non-process discharges from the fertilizer process area.

A. Type of wastewater - Phosphate fertilizer areas (including sulfuric acid manufacturing areas, raw material handling and storage areas, product storage and handling areas, utility areas, maintenance areas, and gypsum handling and storage areas), non-process wastewater: water coming into incidental contact with raw material, intermediate or finished product, by-product, stormwater associated with any construction activity, including demolition, excavation, filling, grading, hauling, storage, and preparation of materials, water from safety showers and related personal safety equipment, any washdown water used throughout the plant. Steam traps, booster pumps seal water, condensate tank/drain overflow, maintenance shack sink and washdown area drainage, K940 cooling sample return lines, 03 condensate dump line, sample point cvapor

condensate water, fuel oil tank dike drainage, lab sink drain, flume recycle lines, analyzer shack drain, and neutralized wash solution from maintenance activities on process equipment in the phosphoric acid and sulfuric acid plant areas.

B. Location - Discharge to the Mississippi River via Final Outfall 001 at Latitude 30°02'21", Longitude 90°49'50".

C. Treatment - none

D. Flow - Continuous, (LTA) 0.432 MGD

E. Receiving waters - Mississippi River via Final Outfall 001

F. Basin and segment - Mississippi River Basin via Final Outfall 001, Subsegment 070301

Internal Outfall 002 - This outfall is not a physical outfall. It is a collection of internal outfalls not associated with the fertilizer process area.

A. Type of wastewater - Combined Sulfuric Acid plant once-through cooling water and utility wastewater at Internal Outfalls 102, 202, and 302; clarifier underflow at Internal Outfall 402; and treated sanitary wastewater at Internal Outfall 502.

B. Location - Discharge to the Mississippi River via Final Outfall 001.

C. Treatment - none

D. Flow - Continuous, (LTA) 72.342 MGD

E. Receiving waters - Mississippi River via Final Outfall 001

F. Basin and segment - Mississippi River Basin via Final Outfall 001, Subsegment 070301

Internal Outfall 102

A. Type of wastewater - Non-contact cooling water of the turbogenerators and sulfuric acid plant - Train "D", and wastewater resulting from turnaround.

B. Location - at the point of discharge from "D" Train sulfuric acid production prior to combining with other waters. Flow monitored at intake to D Train from the power plant at Latitude 30°02'21", Longitude 90°49'48".

C. Treatment - none

D. Flow - Continuous, (LTA) 15.15 MGD

E. Receiving waters - Mississippi River via Final Outfall 001 and Internal Outfall 002

F. Basin and segment - Mississippi River Basin via Final Outfall 001 and Internal Outfall 002, Subsegment 070301

Internal Outfall 202

A. Type of wastewater - Non-contact cooling of the sulfuric acid plants - Trains "A" and "E", and wastewater resulting from turnaround.

B. Location - at the point of discharge from sulfuric acid plants Trains "A" and "E" prior to combining with other waters. Flow shall be monitored on intake of Trains A and E.
Latitude 30°02'21", Longitude 90°49'48".

C. Treatment - none

D. Flow - Continuous, (LTA) 23.36 MGD.

E. Receiving waters - Mississippi River via Final Outfall 001 and Internal Outfall 002

F. Basin and segment - Mississippi River Basin via Final Outfall 001 and Internal Outfall 002, Subsegment 070301

Internal Outfall 302

A. Type of wastewater - Power plant utility water consisting of non-contact cooling water for turbogenerators, and blowdown water from boilers, water softeners, and zeolite reactivators prior to combining with other waters. Includes Internal Outfall 402.

B. Location - at the point of discharge from the power plant area. Total flow shall be monitored on intake to power plant. Flow reported will be total flow minus D train flow.
Latitude 30°02'21", Longitude 90°49'42".

C. Treatment - None

D. Flow - Continuous, (LTA) 33.66 MGD.

E. Receiving waters - Mississippi River via Final Outfall 001 and Internal Outfall 002

F. Basin and segment - Mississippi River Basin via Final Outfall 001 and Internal Outfall 002, Subsegment 070301

Internal Outfall 402

A. Type of wastewater - River water clarifier underflow

B. Location - at the point of discharge from the clarifier unit prior to discharge to the Mississippi River via Final Outfall 001 and Internal Outfall 002 at Latitude 30°02'17", Longitude 90°49'42".

C. Treatment - None

D. Flow - Continuous, (LTA) 0.14 MGD.

E. Receiving waters - Mississippi River via Final Outfall 001 and Internal Outfall 002

F. Basin and segment - Mississippi River Basin via Final Outfall 001 and Internal Outfall 002, Subsegment 070301

Internal Outfall 502

A. Type of wastewater - treated sanitary sewage.

B. Location - at the point of discharge from the treatment facility prior to combining with other waters at Latitude 30°02'23", Longitude 90°49'40".

C. Treatment - treatment of sanitary wastewaters consists of:
- Oxigest sewage treatment plant

D. Flow - Continuous, (LTA) 0.032 MGD.

E. Receiving waters - Mississippi River via Final Outfall 001 and Internal Outfall 002

F. Basin and segment - Mississippi River Basin via Final Outfall 001 and Internal Outfall 002, Subsegment 070301

Internal Outfall 003

A. Type of wastewater - Double lime treated active calcium sulfate pile water and contaminated phosphate fertilizer area non-process wastewater

B. Location - for Flow, Total Phosphorous, and Total Fluoride, at the point of discharge prior to commingling with Internal Outfall 004. For pH, after the commingling of Internal Outfalls 003 and 004,

but prior to commingling with any other wastestream or outfall. Latitude 30°02'24", Longitude 90°49'41".

C. Treatment - Double-lime treatment: neutralization and chemical precipitation

D. Flow - Intermittent

E. Receiving waters - Mississippi River via Final Outfall 001

F. Basin and segment - Mississippi River Basin via Final Outfall 001, Subsegment 070301

Internal Outfall 004

A. Type of wastewater - Discharges related to inactive calcium sulfate storage pile water.

B. Location - at the point of discharge from the inactive calcium sulfate impoundment prior to commingling with Final Outfall 001 at Latitude 30°02'24", Longitude 90°49'41".

C. Treatment - none

D. Flow - Intermittent

E. Receiving waters - Mississippi River via Final Outfall 001

F. Basin and segment - Mississippi River Basin via Final Outfall 001, Subsegment 070301

Final Outfall 105

A. Type of wastewater - Stormwater from areas south of the facility and gypsum stacks, equipment and material storage areas, employee parking lots, railcar activity areas.

B. Location - at the point of discharge from the west-to-east drainage ditch that runs along the south side of Stacks 1-3 prior to entering Bayou des Acadiens. Latitude 30°02'13", Longitude 90°48'16".

C. Treatment - none

D. Flow - Intermittent

E. Receiving waters - Bayou des Acadiens thence into Blind River

F. Basin and segment - Lake Pontchartrain Basin, Subsegment 040401

Final Outfall 205

A. Type of wastewater - Stormwater from areas west of the gypsum stacks

B. Location - at the point of discharge just after the north-south perimeter ditches, which run along the east side of the Inactive Reservoir and Stacks 1-3, combine and turn east toward La. Highway 3125 right-of-way, prior to entering the La. Highway 3125 right-of-way. Latitude 30°02'47", Longitude 90°47'27".

C. Treatment - none

D. Flow - Intermittent

E. Receiving waters - Bayou des Acadiens thence into Blind River

F. Basin and segment - Lake Pontchartrain Basin, Subsegment 040401

Final Outfall 305

A. Type of wastewater - Stormwater from areas north of the gypsum stacks

B. Location - at the point of discharge just after the north-south perimeter ditch, which run along the east side of Stack 4, turns east toward La. Highway 3125 in the vicinity of the northeast corner of Stack 4, prior to entering the La. Highway 3125 right-of-way. Latitude 30°03'15", Longitude 90°49'24".

C. Treatment - none

D. Flow - Intermittent

E. Receiving waters - Bayou des Acadiens thence into Blind River

F. Basin and segment - Lake Pontchartrain Basin, Subsegment 040401

## VIII. Proposed Permit Limits:

The specific effluent limitations and/or conditions will be found in the draft permit. Development and calculation of permit limits are detailed in the Permit Limit Rationale section below.

Summary of Proposed Changes From the Current LPDES Permit:

A. The temperature parameter is proposed to be removed from Final Outfall 001, Internal Outfalls 201, 102, 202, and 302. A water quality temperature screen (Appendix D) indicates that the temperature parameter for this outfall has no reasonable potential to exceed the ambient in-stream temperature standard for the Mississippi River based on data presented in the application.

B. Part II Conditions for implementation of 316(b) Phase II Rule requirements have been placed in the draft permit.

C. Internal Outfall 502 - the statistical bases for Flow, $BOD_5$, TSS, and Fecal Coliform has been changed from Weekly Average to Daily Maximum. This is consistent with current Office guidance for sanitary dischargers at industrial facilities.

D. Internal Outfall 402 - Clarifying Agent information is no longer to be submitted with DMRs. This information shall be kept on site and made available on request.

## IX. Permit Limit Rationale:

The following section sets forth the principal facts and the significant factual, legal, methodological, and policy questions considered in preparing the draft permit. Also set forth are any calculations or other explanations of the derivation of specific effluent limitations and conditions, including a citation to the applicable effluent limitation guideline or performance standard provisions as required under LAC 33:IX.2707/40 CFR Part 122.44 and reasons why they are applicable or an explanation of how the alternate effluent limitations were developed.

### A. TECHNOLOGY-BASED VERSUS WATER QUALITY STANDARDS-BASED EFFLUENT LIMITATIONS AND CONDITIONS

Following regulations promulgated at LAC 33:IX.2707.L.2.b/40 CFR Part 122.44(l)(2)(ii), the draft permit limits are based on either technology-based effluent limits pursuant to LAC 33:IX.2707.A/40 CFR Part 122.44(a) or on State water quality standards and requirements pursuant to LAC 33:IX.2707.D/40 CFR Part 122.44(d), whichever are more stringent.

### B. TECHNOLOGY-BASED EFFLUENT LIMITATIONS AND CONDITIONS

Regulations promulgated at LAC 33:IX.2707.A/40 CFR Part 122.44(a) require technology-based effluent limitations to be placed in LPDES permits based on effluent limitations guidelines where applicable, on BPJ (best professional judgement) in the absence of guidelines, or on a combination of the two. The following is a rationale for types of wastewaters. See outfall information descriptions for associated outfall(s) in Section VII. Regulations also require permits to establish monitoring requirements to yield data representative of the monitored activity [LAC 33:IX.2715/40 CFR 122.48(b)] and

to assure compliance with permit limitations [LAC 33:IX.2707.I./40 CFR 122.44(I)].

Mosaic Fertilizer, LLC, Uncle Sam Plant, is not subject to Best Control Technology Currently Available (BPT) or Best Available Technology Economically Achievable (BAT) effluent limitation guidelines because the applicable guidelines (Phosphatic Fertilizers) were remanded for facilities in Louisiana that existed prior to 1974.

> 40 CFR 418.10 Applicability; description of the phosphate subcategory.
>
> The provisions of this subpart are applicable to discharges resulting from the manufacture of sulfuric acid by sulfur burning, wet process phosphoric acid, normal superphosphate, triple superphosphate and ammonium phosphate, except that the provisions of 40 CFR 418.12, 418.13, and 418.17 shall not apply to wet-process phosphoric acid processes that were under construction either on or before April 8, 1974, at plants located in the State of Louisiana.

Calculations and basis of permit limitations are found below.

1. Final Outfall 001 (*1)- Once-through barometric cooling water, fume scrubber water, and utility wastewater (via Internal Outfalls 101 and 201), phosphate fertilizer area non-process wastewater (*2) and process area stormwater (via Internal Outfall 301); and discharges from Internal Outfall 002, which includes the following internal outfalls: once through cooling water from the sulfuric acid plant (via Internal Outfalls 102 and 202), power plant utility wastewater (via Internal Outfall 302), clarifier underflow (via Internal Outfall 402), and treated sanitary wastewater (via Internal Outfall 502).

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | Continuous |
| Fluoride (*3) | 165,000 | 222,800 | --- | --- | 3/week |
| Total Phosphorous (*3) | 15,000 | 34,200 | --- | --- | 3/week |
| TSS | Report | Report | --- | --- | 3/week |
| Total Sulfate | Report | Report | --- | --- | 3/week |

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Total Radium 226, pCi/ml (*4) | --- | --- | Report (*5) | --- | 1/month |
| Dock Discharges (as P) | Report | Report | --- | --- | 1/month |
| Biomonitoring (*6) | --- | --- | Monthly Avg. Minimum<br><br>Report | 48-Hour Minimum<br><br>Report | 1/quarter, Both species |

(*1) Note: Internal Outfalls 003 and 004 also physically discharge through Final Outfall 001, but are regulated separately except for biomonitoring.

(*2) The discharge of phosphate fertilizer area nonprocess wastewater does not include excess stormwater runoff from the active calcium sulfate pile at Internal Outfall 003 or excess stormwater runoff from the inactive calcium sulfate pile at Internal Outfall 004. The underflow of contaminated freatic water from the inactive calcium sulfate pile will be recycled back to the process, and, if discharged, comply with the limitations at Final Outfall 001 or Internal Outfall 003 as appropriate.

(*3) For the purposes of compliance with the fluoride and total phosphorous limits at Final Outfall 001, the contributions from Internal Outfalls 003 and 004 may be subtracted from that obtained at Final Outfall 001, provided that they are sampled on the same day.

(*4) Comprising at least four representative 24-hr. composite samples combined proportional to flow.

(*5) The quarterly average effluent limit is 0.0032 Curies/day.

(*6) Biomonitoring shall be conducted on the total discharge from Final Outfall 001 that includes the following Internal Outfalls; 101, 201, 301, 002 (Internal Outfalls 102, 202, 302, 402, and 502), 003, and 004.

Flow - this requirement has been established in accordance with LAC 33:IX.2707.I.1.b. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

pH - this requirement has been established in accordance with LAC 33:IX.1113.C.1. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

All other parameters and associated monitoring frequencies shall be retained from the current LPDES permit effective November 1, 2003.

See below for site-specific considerations.

**Site-Specific Consideration(s)**

a. Reactor and Filter Section

Ground phosphate rock is mixed with sulfuric acid and water to produce dilute phosphoric acid. Large amounts of contaminated wastewater are recycled from various systems. For example, wastewater is recycled from the calcium sulfate slurry decant water, the calcium sulfate pile runoff, contaminated area stormwater runoff, wash down, pump seals, leaks and drips, etc. The reactor and filter system use once-through contact (barometric) cooling and scrubber water to control the temperature or remove fumes containing fluorides with once-through river water. This stream is designated Internal Outfall 201, and is discharged at Final Outfall 001.

The reactor is designed and operated to produce large filterable calcium sulfate crystals because the Preyon filter sets the production rate. The filter separates the soluble phosphoric acid product from the insoluble calcium sulfate ($CaSO_4.2H_2O$) byproduct. The dilute acid product is further processed, and the slurry is pumped to the impoundment. The decanted slurry water and contaminated runoff from the impoundment's calcium sulfate piles is recycled to the extent possible to recover acid and phosphate.

Miscellaneous sources of pollution are generated in the reactor area, including precipitation runoff. If the contamination is slight, i.e., is less than the technology treatment levels for fluoride and total phosphorous, and the sources are terminated within 24 hours, the discharge is considered contaminated nonprocess wastewater. The formal definition is promulgated at 40 CFR 418(c), and the requirements are contained at 40 CFR 418.13(d). The guidelines do not apply, but they are determined to be applicable (BPJ) in accordance with Section 410(a) of the Clean Water Act. This concept was made part of previously issued permit requirements at Final Outfall 001.

b. Evaporator Section

The dilute acid is concentrated to 54% $P_2O_5$ to comply with specifications for the manufacture of diammonium phosphate elsewhere. The evaporators use barometric once-through cooling river water (OTCW) which absorbs volatile hydrofluoric acid, silicon tetrafluoride, and entrained phosphoric acid. Swift towers are placed on the intermediate and final evaporators to remove those volatile contaminants, which react to form fluorosilicic acid ($H_2SiF_6$). This was part of the FDF Variance agreement with the facility. The guidelines require the use of recycled cooling water to achieve no discharge. The OTCW is discharged at Internal Outfall 101 and is limited in the permit for

fluoride and total phosphorous at Final Outfall 001. The effluent limitations and monitoring requirements are not modified in the draft permit. At present, the permittee reports (no limitations) Total Suspended Solids, Total Sulfates, and Total Radium 226 at Final Outfall 001.

c. Sulfuric Acid and Power Generation

The manufacture of sulfuric acid and the generation of power at the Uncle Sam plant uses large amounts of once-through river cooling water. Internal Outfall 002 commingles with Final Outfall 001, but Internal Outfalls 102, 202, and 302 are regulated prior to commingling with any other stream. Most of the time, this water is noncontact cooling water, with the exception of some boiler feed water waste and occasional sulfuric acid leaks in the cooling coils. These discharges should meet the continuous pH requirements of between 6.0 and 9.0 standard units 99% of the time. This is the same as the previously issued permits.

d. Fluoride and Phosphorous Limitations

According to the Fact Sheet dated January 13, 1986, the Fluoride limit of Outfall 001 was based on the Swift Tower removal efficiency and contributions from once-through scrubber water on the flash cooler, the reactor and the filter.

The Fact Sheet prepared on December 23, 1991, provided the rationale for the Outfall 001 phosphorous limit:

> "We are proposing to continue the effluent limitations and monitoring requirements for Outfall 001 of the previous permit. The fluoride and total phosphorous limitations were based upon Swift Tower fluoride collection at the evaporators. The permittee indicated that the scrubber action of the Swift Towers have reduced the daily average total phosphorous to less than 15,000 lbs/day for Outfall 001. We are establishing that amount as BAT for this facility at the present time in our best professional judgement."

2. Internal Outfalls 102, 202, and 302. Internal Outfall 102, non-contact cooling water of the turbogenerators and sulfuric acid plant - Train "D", and wastewater resulting from turnaround. Internal Outfall 202, non-contact cooling of the sulfuric acid plants - Trains "A" and "E", and wastewater resulting from turnaround. Internal Outfall 302, power plant utility water consisting of non-contact cooling water for turbogenerators, and blowdown water from boilers, water softeners, and zeolite reactivators, and includes Internal Outfall 402

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | Continuous |
| pH Range Excursions No. of Events >60 minutes | --- | 0 (*1) | --- | --- | Continuous |
| pH Range Excursions Monthly Total Accumulated Time in Minutes | --- | 446 (*1) | --- | --- | Continuous |
| pH (Standard Units) | --- | --- | Report (*1) (Min) | Report (*1) (Max) | Continuous |

(*1) The pH shall be within the range of 6.0 - 9.0 standard units at all times subject to the continuous monitoring pH range excursion provisions following:

pH RANGE EXCURSION PROVISIONS

Where a permittee continuously measures the pH of wastewater as a requirement or option in a Louisiana Pollutant Discharge Elimination System (LPDES) permit, the permittee shall maintain the pH of such wastewater within the range set forth in the permit, except that excursions from the range are permitted, provided:

A. The total time during which the pH values are outside the required range of pH values shall not exceed 446 minutes in any calendar month; and

B. No individual excursion from the range of pH values shall exceed 60 minutes.

For the purposes of this section, an "excursion" is an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth in the permit.

Flow - this requirement has been established in accordance with LAC 33:IX.2707.I.1.b. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

pH - this requirement has been established in accordance with LAC 33:IX.1113.C.1. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

3. Internal Outfall 402 - river water clarifier underflow

UTILITY

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | 1/week |
| Clarifying Agents | Report (*1) | Report (*1) | --- | --- | 1/month |

(*1) The quantity and types of coagulants (clarifying agents) used in the intake raw river water treatment clarification system during the sampling month shall be recorded. Records of the quantity and type of coagulants used shall be retained for three (3) years following Part III.C.3. No DMR reporting shall be required.

The clarifier underflow is proposed to be regulated as in the previous permit. Monitoring requirements are the same as in the previous permit.

Flow - this requirement has been established in accordance with LAC 33:IX.2707.I.1.b. and retained from the current LPDES permit effective on November 1, 2003. The 1/week monitoring frequency has also been retained.

Other parameter (Clarifying Agents) and associated monitoring frequency shall be retained from the current LPDES permit effective November 1, 2003.

4. Internal Outfall 502 - treated sanitary sewage

Sanitary wastewaters (internal or external) are regulated in accordance with LAC 33:IX.711 or 709.B, by BPJ utilizing the sanitary general permits issued by this Office, and the Louisiana Water Quality Management Plan, Areawide Sanitary Effluent Limits Policy and Statewide Sanitary Effluent Limits Policy, as applicable. Concentration limits are used in accordance with LAC 33:IX.2709.F.1.b which states that mass limitations are not necessary when applicable standards and limitations are expressed in other units of measurement. LAC 33:IX.709.B references LAC 33:IX.711 which express $BOD_5$ and TSS in terms of concentration.

SANITARY CLASS II

Also for use for Miss., Atchafalaya, or Red River. For other receiving waters see AELP or GELP. According to the Statewide Sanitary Effluent Limitations Policy, these dischargers shall receive limitations equivalent to secondary treatment.

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | 1/month |
| $BOD_5$ | --- | --- | 30 | 45 | 1/month |
| TSS | --- | --- | 30 | 45 | 1/month |
| Fecal Coliform colonies/100ml | --- | --- | 200 | 400 | 1/month |

Monitoring frequencies shall be retained from the current LPDES permit effective November 1, 2003.

5. Internal Outfall 003 - Double lime treated active calcium sulfate pile water and contaminated phosphate fertilizer area non-process wastewater

Mosaic Fertilizer, LLC, Uncle Sam Plant is not subject to Best Practicable Control Technology Currently Available (BPT) and Best Available Technology Economically Achievable (BAT) effluent limitation guidelines listed below, but they are applied by BPJ, as in the previous permit:

| Manufacturing Operation | Guideline |
|---|---|
| Phosphate Fertilizer | 40 CFR 418.10 |

The relevant portions of 40 CFR 418.13 (BAT) are presented below:

"(a) Subject to the provisions of paragraphs (b) and (c) of this section, the following limitations establish the quantity or quality of pollutants or pollutant properties controlled by this section, which may be discharged by point source subject to the provisions of this subpart after application of the best available technology economically achievable: There shall be no discharge of process wastewater pollutants to navigable waters."

"(b) Process wastewater pollutants from a calcium sulfate storage pile runoff facility operated separately or in combination with a water recirculation system designed, constructed and operated to maintain a surge capacity equal to the runoff from the 25-year, 24-hour rainfall event may be discharged,

after treatment to the standards set forth in paragraph (c) of this section, whenever chronic or catastrophic precipitation events cause the water level to rise into the surge capacity. Process wastewater must be treated and discharged whenever the water level equals or exceeds the midpoint of the surge capacity."

"(c) The concentration of pollutants discharged in the process wastewater pursuant to the limitations of paragraph (b) of this section shall not exceed the values listed in the following:

Total Phosphorous (as P):
maximum concentration for any day: 105 mg/L
average of daily values for 30 consecutive days shall not exceed:
35 mg/L

Fluoride:
maximum concentration for any day: 75 mg/L
average of daily values for 30 consecutive days shall not exceed:
25 mg/L

Utility wastewaters including, but not limited to, cooling tower blowdown, vacuum pump seal cooling water, bearing cooling water, air conditioner condensate, etc., that are included as a part of the "process wastewater stream" shall receive no additional BPJ allocations for Fluoride and Phosphorous.

The facility employs technology in the phosphoric acid plant and associated active calcium sulfate impoundment which results in a negative water balance. However, there may be occasions when the ambient rainfall could exceed the recycle rate plus storage capacity, and process wastewater must be treated and discharged.

The guideline technology promulgated at 40 CFR 418, as discussed earlier, was rescinded for southern Louisiana phosphatic fertilizer facilities. This allowed the creation of inactive calcium sulfate impoundments. The guideline technology is referenced in Part II of the permit and applies to the active impoundment and phosphoric acid plant. The technology requires no discharge of process pollutants from the manufacturing plant and the active impoundment system except for the existing once-through barometric cooling water system at Internal Outfall 101. However, excess precipitation falling on the active system and the phosphoric acid production area which causes the water level to rise into the surge capacity of the impoundment may need to be treated and discharged to maintain the surge capacity specified. The surge capacity must be capable of containing a 25-year, 24-hour record rainfall event. Treatment and discharge of process wastewater is optional for water below the midpoint of the surge capacity. Treatment and discharge is mandatory for water levels above the midpoint of the surge capacity whenever the plant is not actively recycling water from the impoundment. Compliance with these provisions requires a negative water balance including the average annual rainfall on the

active area. These requirements for Internal Outfall 003 are established by BPJ. No other discharges from Internal Outfall 003 are authorized by this permit.

The monitoring requirements for this outfall are the same as in the previously issued permit. The requirement to treat and discharge for water levels above the midpoint of the surge capacity whenever the plant is not actively recycling water from the impoundment is a previous change made in response to a request from the permittee. Since, under current practices, the plant has a choice of either treating and discharging or recycling, and recycling removes a greater amount of water from the impoundment, it is logical that continuing to recycle when water reaches the midpoint of the surge capacity maintains a greater amount of the surge capacity than treatment and discharge. Nonetheless, any discharge of untreated impoundment water through Internal Outfall 003 is a violation of the permit.

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | Continuous |
| Total Phosphorous (as P) | Report (*1) | Report (*1) | 35 | 105 | 3/week |
| Total Fluoride | Report | Report | 25 | 75 | 3/week |
| pH Range Excursions No. of Events >60 minutes | --- | 0 (*2) | --- | --- | Continuous |
| pH Range Excursions Monthly Total Accumulated Time in Minutes | --- | 446 (*2) | --- | --- | Continuous |
| pH (Standard Units) | --- | --- | Report (*2) (Min) | Report (*2) (Max) | Continuous |
| Biomonitoring | --- | --- | Monthly Avg. Minimum<br><br>Report | 48-Hour Minimum<br><br>Report | 1/quarter |

(*1) The mass sum of Internal Outfalls 003 and 004 shall not exceed the following:

PHOSPHOROUS LIMITS FOR INTERNAL OUTFALLS 003 AND 004

The combined daily maximum total phosphorous [*1] in pounds per day discharged through Internal Outfalls 003 and 004 is based on the flow of the Mississippi River and shall not exceed the values calculated as follows:

1. For Mississippi River flows below 200,000 cfs:
   Total phosphorous = 0.3(0.955602*Q - 105,300)
2. For Mississippi River flows equal to or greater than 200,000 cfs and less than 300,000 cfs:
   Total phosphorous = 0.3(0.955602*Q - 127,700)
3. For Mississippi River flows equal to or greater than 300,000 cfs and less than 400,000 cfs:
   Total phosphorous = 1/3(0.955602*Q - 127,700)
4. For Mississippi River flows equal to or greater than 400,000 cfs:
   Total phosphorous = 0.4(0.955602*Q - 127,700)- 34,000

Where Q = Mississippi River flow in cfs.

[*1] The relationship between the Phosphorous TMDL and River Flow (Q) is based on the report "Evaluation and Projection of Water Quality Impacts from Nutrient Loading" (Figure 30 p. 48) published by the Department of Environmental Quality. The original formula established by the report is as follows:

Phosphorous TMDL(lbs/day) = 0.955602 x Q(cfs) - 2.691175E-04

Since the constant term, (2.691175E-04 = 0.0002691175) is numerically insignificant, it is not considered in the formula used to assign permit limits.

(*2) The pH shall be within the range of 6.0 - 9.0 standard units at all times subject to the continuous monitoring pH range excursion provisions following:

pH RANGE EXCURSION PROVISIONS

Where a permittee continuously measures the pH of wastewater as a requirement or option in a Louisiana Pollutant Discharge Elimination System (LPDES) permit, the permittee shall maintain the pH of such wastewater within the range set forth in the permit, except that excursions from the range are permitted, provided:

A. The total time during which the pH values are outside the required range of pH values shall not exceed 446 minutes in any calendar month; and

B. No individual excursion from the range of pH values shall exceed 60 minutes.

For the purposes of this section, an "excursion" is an unintentional and temporary incident in which the pH value of discharge wastewater exceeds the range set forth in the permit.

Flow - this requirement has been established in accordance with LAC 33:IX.2707.I.1.b. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

pH - this requirement has been established in accordance with LAC 33:IX.1113.C.1. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

6. Internal Outfall 004 - discharges related to inactive calcium sulfate storage pile water

The inactive calcium sulfate pile concept was created to relieve the facility of the obligation to recycle all process related wastewater from the relatively large calcium sulfate piles and impoundment. The facility has the incentive to capture all possible $P_2O_5$ from the calcium sulfate piles, and there is a total phosphorous water quality standards effluent limitation for the facility which maintains the phosphorous content of the effluent at levels that prevent algae blooms or other forms of eutrophication. This limit is established in Part I of the permit and is based on actual river flow and is also presented in the discussion for Internal Outfall 003.

As in previously issued permits, an annual limitation of the discharge of phosphorous from Internal Outfall 004 is included in the permit in Part II.

Stormwater runoff from the inactive calcium sulfate storage pile receives BPJ reporting requirements, as in the previous permit.

Inactive Calcium Sulfate Storage Pile Excess Stormwater Runoff

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | Continuous |

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| pH Standard Units | --- | --- | Report (min) | Report (max) | Continuous |
| Total Phosphorous (as P) (*1) | Report | Report | Report | Report | 3/week |
| Calculated Total Phosphorous limit based on river flow | (*1) | (*1) | Report | Report | 3/week |
| Total Phosphorous Exceedances | Report | 0 (days) | --- | --- | 3/week |
| Total Fluoride | Report | Report | Report | Report | 3/week |
| Total Sulfate | Report | Report | Report | Report | 3/week |
| Total Radium 226 (*2) | Report | Report | 0.4 pCi/ml | 0.5 pCi/ml | 1/month |
| Total Uranium | Report | Report | Report | Report | 1/week |
| Gross Alpha Particle Activity (*2) | Report | Report | Report | Report | 1/month |
| Total Aluminum | Report | Report | Report | Report | 1/week |
| Total Antimony | Report | Report | Report | Report | 1/month |
| Total Arsenic | Report | Report | Report | Report | 1/month |
| Total Beryllium | Report | Report | Report | Report | 1/month |
| Total Cadmium | Report | Report | Report | Report | 1/week |
| Total Chromium | Report | Report | Report | Report | 1/month |
| Total Copper | Report | Report | Report | Report | 1/month |
| Total Lead | Report | Report | Report | Report | 1/month |
| Total Mercury | Report | Report | Report | Report | 1/month |
| Total Nickel | Report | Report | Report | Report | 1/month |
| Total Selenium | Report | Report | Report | Report | 1/month |

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Total Silver | Report | Report | Report | Report | 1/month |
| Total Thallium | Report | Report | Report | Report | 1/month |
| Total Zinc | Report | Report | Report | Report | 1/month |
| TSS | Report | Report | Report | Report | 3/week |
| Stream Flow (cfs) | --- | --- | --- | Report (*3) | 1/day |
| Biomonitoring | --- | --- | Monthly Avg. Minimum<br>Report | 48-Hour Minimum<br>Report | 1/quarter |

(*1) The daily maximum mass limits vary with Mississippi River flow and are defined under the discussion for Internal Outfall 003 above and in Part II of the permit.

(*2) Mass units are in pico-Curies/day and concentration units are in pico-Curies/milliliter.

(*3) Mississippi River flow will be obtained from the U.S. Army Corps of Engineers in New Orleans for the Tarbert's Landing gauge near the Old River Diversion Structure. The flow for every day of the month shall be reported and attached to the monthly Discharge Monitoring Report (DMR). The minimum flow shall be reported on the DMR.

Flow - this requirement has been established in accordance with LAC 33:IX.2707.I.1.b. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

pH - this requirement has been established in accordance with LAC 33:IX.1113.C.1. and retained from the current LPDES permit effective on November 1, 2003. The continuous monitoring frequency has also been retained.

All other parameters and associated monitoring frequencies shall be retained from the current LPDES permit effective November 1, 2003. These parameters were originally established in the 1987 NPDES permit, for the purpose of data gathering based on potential pollutants present in raw phosphate rock. BPJ

limitations were established in the 1987 NPDES permit for Radium 226 and Phosphorous Exceedances. These limitations are now considered BAT for this facility.

7. Final Outfalls 105, 205, and 305 - Stormwater

Final Outfall 105 - Stormwater from areas south of the facility and gypsum stacks, equipment and material storage areas, employee parking lots, railcar activity areas

Final Outfall 205 - Stormwater from areas west of the gypsum stacks

Final Outfall 305 - Stormwater from areas north of the gypsum stacks

Uncontaminated or low potential contaminated stormwater discharged through discrete outfall(s) not associated with process wastewater shall receive the following BPJ limitations in accordance with this Office's guidance on stormwater, letter dated 6/17/87, from J. Dale Givens (LDEQ) to Myron Knudson (EPA Region 6).

STORMWATER

| PARAMETER(S) | MASS, LBS/DAY unless otherwise stated | | CONCENTRATION, MG/L unless otherwise stated | | MEASUREMENT FREQUENCY (*1) |
|---|---|---|---|---|---|
| | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM | |
| Flow, MGD | Report | Report | --- | --- | 1/week |
| TOC | --- | --- | --- | 50 | 1/month |
| Oil & Grease | --- | --- | --- | 15 | 1/month |
| pH Standard Units | --- | --- | 6.0 (min) | 9.0 (max) | 1/month |
| Total Phosphorous | --- | --- | Report | Report | 1/quarter |
| Total Nitrogen | --- | --- | Report | Report | 1/quarter |

(*1) When discharging.

Total Nitrogen monitoring with a 1/quarter monitoring frequency was added to this outfall due to the fact that the receiving stream subsegment, 040401, is listed as being impaired for the nutrient parameter, Nitrogen. See Section IX.C of this factsheet.

Total Phosphorous monitoring with a 1/quarter monitoring frequency was maintained at this outfall due to the fact that the receiving stream

subsegment, 040401, is listed as being impaired for the nutrient parameter, Phosphorous. See Section IX.C of this factsheet.

In accordance with LAC 33:IX.2707.I.3 and 4 [40 CFR 122.44(I)(3) and (4)], a Part II condition is proposed for applicability to all storm water discharges from the facility, either through permitted outfalls or through outfalls which are not listed in the permit or as sheet flow. **For first time permit issuance,** the Part II condition requires a Storm Water Pollution Prevention Plan (SWP3) within six (6) months of the effective date of the final permit. **For renewal permit issuance,** the Part II condition requires that the Storm Water Pollution Prevention Plan (SWP3) be reviewed and updated, if necessary, within six (6) months of the effective date of the final permit. If the permittee maintains other plans that contain duplicative information, those plans could be incorporated by reference to the SWP3. Examples of these type plans include, but are not limited to: Spill Prevention Control and Countermeasures Plan (SPCC), Best Management Plan (BMP), Response Plans, etc. The conditions will be found in the draft permit. Including Best Management Practice (BMP) controls in the form of a SWP3 is consistent with other LPDES and EPA permits regulating similar discharges of stormwater associated with industrial activity, as defined in LAC 33:IX.2511.B.14 [40 CFR 122.26(b)(14)].

## C. WATER QUALITY-BASED EFFLUENT LIMITATIONS

Technology-based effluent limitations and/or specific analytical results from the permittee's application were screened against state water quality numerical standard based limits by following guidance procedures established in the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, LDEQ, October 7, 2009. Calculations, results, and documentation are given in Appendix B.

In accordance with 40 CFR § 122.44 (d)(1)/LAC 33:IX.2707.D.1, the existing (or potential) discharge (s) was evaluated in accordance with the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, LDEQ, October 7, 2009, to determine whether pollutants would be discharged "at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard." Calculations, results, and documentation are given in Appendix B.

The following pollutants received water quality based effluent limits:

| POLLUTANT(S) |
|---|
| None (*1) |

(*1) There is a river-flow dependent water quality based effluent limitation for total phosphorous for Internal Outfalls 003 and 004 (discussed under Section IX.B.5), which is continued from the previous permit. There are no water quality based effluent limitations for Final Outfall 001.

Minimum quantification levels (MQL's) for state water quality numerical standards-based effluent limitations are set at the values listed in the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, LDEQ, October 7, 2009. They are also listed in Part II of the permit.

**Site-Specific Consideration(s) Related to Water Quality in the Mississippi River Basin for Outfall 001**

The LDEQ is aware of the occurrence of a low oxygen hypoxic or "dead zone" in the Gulf of Mexico and its relationship to nutrients and fresh water from the Mississippi River and has developed a criteria development plan for state waters in coordination with EPA to create defensible nutrient criteria based on the best available science. Work on criteria for the Mississippi River is an ongoing effort and will require further scientific investigation because of the complex nature of the large Mississippi River watershed which includes over 30 states and two Canadian Provinces. A reopener clause has been established in the permit in accordance with LAC 33:IX.2903 which allows LDEQ to modify, or alternatively, revoke and reissue the permit to comply with any more stringent nutrient limitations or requirements that are promulgated in the future.

**TMDL Waterbodies**

Subsegment No. 070301 of the Mississippi River Basin is not listed on LDEQ's 2006 Final Integrated 303(d) List as being impaired.

Subsegment No. 040401 of the Lake Pontchartrain Basin is listed on LDEQ's 2006 Final Integrated 303(d) List as being impaired for Mercury, Nutrients, (Nitrate + Nitrite as N), Organic Enrichment/Low Dissolved Oxygen (DO), Sedimentation/Siltation, Turbidity, and Phosphorous. To date, no Total Maximum Daily Loading assessments have been completed for this subsegment. The TMDL Assessments for this subsegment are scheduled to be completed by 2011-2012. Based on an evaluation of the discharges (stormwater runoff), it was determined that the permittee does not have the potential to discharge constituents that could contribute to the impairments for Mercury, Sedimentation/Siltation, and Turbidity. However, this discharge does have the potential to contribute to the impairment for Nutrients and Organic Enrichment/Low DO. Therefore, the limit for TOC will be continued in the permit. Generally in regard to nutrients, (Nitrogen and Phosphorous), LDEQ has determined that Organic Enrichment/DO directly correlates with overall nutrient impact. Thus when Organic Enrichment/DO is limited, the LDEQ is in effect also limiting and controlling nutrient concentrations and impacts. However, since the permittee operates a fertilizer facility which is known to handle constituents that could have an impact on nutrients, the reporting requirement for Total Nitrogen and Total Phosphorous will be continued in the permit.

A reopener clause has been placed in Part II of the permit to allow for more stringent or additional limitations or requirements to be placed in the permit, if needed, as a result of any future TMDLs.

**316(b) Requirements**

- July 6, 2004, EPA promulgated 'Phase II' regulations in accordance with section 316(b) of the Clean Water Act (CWA).
- January 25, 2007, the Second U.S. Circuit Court of Appeals remanded several provision of the Phase II rule.
- March 20, 2007, EPA issued a memo saying, "the rule should be considered suspended."
- July 9, 2007, Federal Register notice suspending all parts of the Phase II regulations except for 40 CFR 125.90(b) [LAC 33:IX.4731.B]

The permittee shall comply with effective regulations promulgated in accordance with section 316(b) of the CWA for cooling intake structures. LAC.IX.4731.B provides for regulating cooling water intake structures (CWIS) for existing facilities on a case-by-case basis using best professional judgment.

This facility was issued a number of previous NPDES and/or LPDES permits and has been withdrawing once-through, non-contact cooling water without any identified problems since 1958. LDEQ has no information which either identifies or verifies any past or current adverse environmental impacts associated with the withdrawal of the applicable cooling water. Based on information provided by the permittee via email on April 1, 2010, the Cooling Water Intake System (CWIS) consists of one intake structure with four pumps. The CWIS is located on the left descending bank of the Mississippi River. The CWIS is about 50 to 60 feet from the top of the levee and goes to an elevation of -12 feet (with the current river stage at around 18 feet this would make the depth below the river surface at around 30 feet). The design intake flow is about 140,000 gpm (approximately 62% is used for non-contact cooling, 36% is used for contact cooling, and 2% is used for non cooling usage). The screen type is a rotating mesh traveling bar screen. LDEQ has made the determination that this CWIS represents the best technology available. This determination is based on current information available and will be re-evaluated either upon promulgation of revised 316(b) Phase II regulations or upon evaluation of the environmental impacts of their CWIS as described below, whichever becomes available first. The revised 316(b) Phase II regulation will supersede any requirements contained in the applicable permit. In addition LDEQ will require an evaluation of the environmental impacts of applicable CWIS as stated in the individual permit and as described in the following paragraphs:

The permittee shall comply with effective regulations promulgated in accordance with section 316(b) of the CWA for cooling water intake structures. The permittee also must evaluate the environmental impacts of their CWIS by characterizing the fish/shellfish in the vicinity of the CWIS and assessing

impingement mortality and entrainment and shall submit the assessment results to LDEQ no later than four (4) years from the effective date of this permit. Based on the information submitted to LDEQ, the permit may be reopened to incorporate limitations and/or requirements for the CWIS.

The fish/shellfish impingement mortality and entrainment assessment must include the following:

1. Source water physical data including a narrative description, scaled drawings, identification and characterization of the source water body's hydrological and geomorphological features, methods used to conduct any physical studies to determine your intake's area of influence within the water body and the results of such studies, location maps showing the physical configuration of the source water body, and other documentation which supports your assessment of the water body;

2. Cooling water intake structure data including a narrative description of the configuration, location, engineering drawings, and operation of your CWIS, including design intake flow velocity; flow distribution, and water balance diagram that includes all sources of water to the facility, recirculating flows, and discharges;

3. Cooling water system data including a narrative description of the operation of your cooling water system, its relationship to the CWIS, the proportion of the design intake flow that is used in the system, the number of days of the year the cooling water system is in operation and seasonal changes in the operation of the system, if applicable;

4. Source water biological evaluation which includes the fish/shellfish assessment and the impingement mortality/entrainment assessment; and

5. An assessment of the cooling water system which includes a discussion or description of how structural or operational actions currently in place reduce adverse environmental impacts caused by your CWIS, and a discussion of additional structural or operational actions, if any, that have been reviewed or evaluated as possible measures to further reduce environmental impacts caused by your CWIS.

D. Biomonitoring Requirements

It has been determined that there may be pollutants present in the effluent which may have the potential to cause toxic conditions in the receiving stream. The State of Louisiana has established a narrative criteria which states, "toxic substances shall not be present in quantities that alone or in combination will be toxic to plant or animal life." The Office of Environmental Services requires the use of the most recent EPA biomonitoring protocols.

Whole effluent biomonitoring is the most direct measure of potential toxicity which incorporates both the effects of synergism of effluent components and receiving stream water quality characteristics. Biomonitoring of the effluent is, therefore, required as a condition of this permit to assess potential toxicity. The biomonitoring procedures stipulated as a condition of this permit for Outfall(s) 001 are as follows:

| TOXICITY TESTS | FREQUENCY |
|---|---|
| Acute static renewal 48-hour definitive toxicity test using Daphnia pulex | 1/Quarter |
| Acute static renewal 48-hour definitive toxicity test using fathead minnow (Pimephales promelas) | 1/Quarter |

Toxicity tests shall be performed in accordance with protocols described in the latest revision of the "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms." The stipulated test species are appropriate to measure the toxicity of the effluent consistent with the requirements of the State water quality standards. The biomonitoring frequency has been established to reflect the likelihood of ambient toxicity and to provide data representative of the toxic potential of the facility's discharge in accordance with regulations promulgated at LAC 33:IX.2715/40 CFR Part 122.48.

Results of all dilutions as well as the associated chemical monitoring of pH, temperature, hardness, dissolved oxygen, conductivity, and alkalinity shall be documented in a full report according to the test method publication mentioned in the previous paragraph. The permittee shall submit a copy of the first full report to the Office of Environmental Compliance. The full report and subsequent reports are to be retained for three (3) years following the provisions of Part III.C.3 of this permit. The permit requires the submission of certain toxicity testing information as an attachment to the Discharge Monitoring Report.

This permit may be reopened to require effluent limits, additional testing, and/or other appropriate actions to address toxicity if biomonitoring data show actual or potential ambient toxicity to be the result of the permittee's discharge to the receiving stream or water body. Modification or revocation of the permit is subject to the provisions of LAC 33:IX.3105/40 CFR 124.5. Accelerated or intensified toxicity testing may be required in accordance with Section 308 of the Clean Water Act.

Dilution Series

The permit requires five (5) dilutions in addition to the control (0% effluent) to be used in the toxicity tests. These additional effluent concentrations shall be 2%, 3%, 4%, 6%, and 7%. The low-flow effluent concentration (critical dilution) is defined as 6% effluent.

I. **Compliance History/DMR Review:**

A. LDEQ records were reviewed for the period of ,November 2007 through November 2009. No water enforcement actions were issued during this time period. However, a solid waste enforcement action (SE-C-09-0150) was issued to this facility on August 3, 2009. There are no other open enforcement actions listed for this facility under any other media during this time period.

B. A DMR review of the monitoring reports covering the monitoring period of November 2007 through November 2009 revealed the following effluent excursions:

| DATE | PARAMETER | OUTFALL | REPORTED VALUE | | PERMIT LIMITS | |
|---|---|---|---|---|---|---|
| | | | MONTHLY AVERAGE | DAILY MAXIMUM | MONTHLY AVERAGE | DAILY MAXIMUM |
| 08/09 | Total Phosphorous | 001 | | 48,082 lbs/day | | 34,200 lbs/day |
| 11/08 | TSS | 502 | | 55.4 mg/L (Weekly Average) | | 45 mg/L (Weekly Average) |
| 06/08 | Total Radium 226 | 004 | | 2.25 pCi/ml | | 0.5 pCi/ml |

C. The most recent inspection was conducted on January 28, 2008. There were no areas of concern noted in the inspection report.

II. **"IT" Questions - Applicant's Responses**

This applicant is not required to submit "IT" Questions in accordance with La. R.S. 30:2018(A). However, the permittee has provided "IT" Questions as part of the application submittal (dated May 5, 2008).

**III. Endangered Species:**

The receiving waterbody, Subsegment 070301 of the Mississippi River Basin (Final Outfall 001), has been identified by the U.S. Fish and Wildlife Service (FWS) as habitat for the Pallid Sturgeon, which is listed as a threatened and/or endangered species. LDEQ has submitted this draft permit to the FWS for review in accordance with a letter dated 1/11/10 from Rieck (FWS) to Nolan (LDEQ). As set forth in the Memorandum of Understanding between the LDEQ and the FWS, and based on information provided by the FWS, LDEQ has determined that the issuance of the LPDES permit is not likely to have an adverse effect upon the Pallid Sturgeon. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat. Therefore, the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat.

The receiving waterbody, Subsegment 040401 of the Lake Pontchartrain Basin (Final Outfalls 105, 205, and 305), have been identified by the U.S. Fish and Wildlife Service (FWS) as habitat for the Gulf Sturgeon and the West Indian Manatee, which are listed as a threatened and/or endangered species. LDEQ has submitted this draft permit to the FWS for review in accordance with a letter dated 1/11/10 from Rieck (FWS) to Nolan (LDEQ). As set forth in the Memorandum of Understanding between the LDEQ and the FWS, and based on information provided by the FWS, LDEQ has determined that the issuance of the LPDES permit is not likely to have an adverse effect upon the Gulf Sturgeon and West Indian Manatee. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat. Therefore, the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat.

**IV. Historic Sites:**

The discharge is from an existing facility location, which does not include an expansion on undisturbed soils. Therefore, there should be no potential effect to sites or properties on or eligible for listing on the National Register of Historic Places, and in accordance with the "Memorandum of Understanding for the Protection of Historic Properties in Louisiana Regarding LPDES Permits" no consultation with the Louisiana State Historic Preservation Officer is required.

**V. Tentative Determination:**

On the basis of preliminary staff review, the Department of Environmental Quality has made a tentative determination to reissue a permit for the discharge described in the application.

**VI. Variances:**

No requests for variances have been received by this Office.

**VII. Public Notices:**

Upon publication of the public notice, a public comment period shall begin on the date of publication and last for at least 30 days thereafter. During this period, any interested persons may submit written comments on the draft permit and may request a public hearing to clarify issues involved in the permit decision at this Office's address on the first page of the fact sheet. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

Public notice published in:

Local newspaper of general circulation

Office of Environmental Services Public Notice Mailing List

# Appendix A

MEMORANDUM

TO: Sonja Loyd

FROM: Todd Franklin

DATE: November 19, 2009

RE: Stream Flow and Water Quality Characteristics for the Mississippi River, receiving waters for the Mosaic Fertilizer, LLC / Uncle Sam Plant (Permit No. LA0004847, AI 2532)

The discharge from Outfall 001 flows into the Mississippi River. Ambient data for hardness and TSS was taken from ambient monitoring station #0319 (Mississippi River East of Plaquemine at the Plaquemine ferry landing, midstream). The following results were obtained:

Average hardness = 153.4 mg/l
$15^{th}$ percentile TSS = 32 mg/l

Based on historical data, the 7Q10 on the Mississippi River at this location has been determined to be 141,955 cfs and the harmonic mean has been determined to be 366,748 cfs.

If you have additional questions or comments, please contact me at 2-3138.

# Appendix B

wqsmodn.wk4 Date: 04/05 Appendix B-1 Page 1
Developer: Bruce Fielding Time: 03:38 PM
Software: Lotus 4.0 LA0004847, AI2532
Revision date: 3/11/09

Water Quality Screen for Mosaic Fertilizer, LLC - Uncle Sam Plant

Input variables:

Receiving Water Characteristics:

| | |
|---|---|
| Receiving Water Name= | Mississippi River (070301) |
| Critical flow (Qr) cfs= | 141955 |
| Harm. mean/avg tidal cfs= | 366748 |
| Drinking Water=1 HHNPCR=2 | 1 |
| MW=1, BW=2, 0=n | |
| Rec. Water Hardness= | 153.4 |
| Rec. Water TSS= | 32 |
| Fisch/Specific=1,Stream=0 | |
| Diffuser Ratio= | |

Effluent Characteristics:

| | |
|---|---|
| Permittee= | Mosaic Fertilizer, LLC - Uncle Sam Plant |
| Permit Number= | LA0004847, AI2532 |
| Facility flow (Qef),MGD= | 172.3 |
| Outfall Number = | 001 |
| Eff. data, 2=lbs/day | 2 |
| MQL, 2=lbs/day | 1 |
| Effluent Hardness= | N/A |
| Effluent TSS= | N/A |
| WQBL ind. 0=y, 1=n | |
| Acute/Chr. ratio 0=n, 1=y | 1 |
| Aquatic,acute only1=y,0=n | |

Page Numbering/Labeling

| | |
|---|---|
| Appendix | Appendix B-1 |
| Page Numbers 1=y, 0=n | 1 |
| Input Page # 1=y, 0=n | 1 |

Fischer/Site Specific inputs:

| | |
|---|---|
| Pipe=1,Canal=2,Specific=3 | |
| Pipe width, feet | |
| ZID plume dist., feet | |
| MZ plume dist., feet | |
| HHnc plume dist., feet | |
| HHc plume dist., feet | |

Fischer/site specific dilutions:

| | |
|---|---|
| F/specific ZID Dilution = | --- |
| F/specific MZ Dilution = | --- |
| F/specific HHnc Dilution= | --- |
| F/specific HHc Dilution= | --- |

Dilution:

| | |
|---|---|
| ZID Fs = | 0.033333 |
| MZ Fs = | 0.333333 |
| Critical Qr (MGD)= | 91745.52 |
| Harm. Mean (MGD)= | 237029.2 |
| ZID Dilution = | 0.053336 |
| MZ Dilution = | 0.005602 |
| HHnc Dilution= | 0.001875 |
| HHc Dilution= | 0.000726 |
| ZID Upstream = | 17.74918 |
| MZ Upstream = | 177.4918 |
| MZhhnc Upstream= | 532.4754 |
| MZhhc Upstream= | 1375.677 |
| ZID Hardness= | --- |
| MZ Hardness= | --- |
| ZID TSS= | --- |
| MZ TSS= | --- |

Multipliers:

| | |
|---|---|
| WLAa --> LTAa | 0.32 |
| WLAc --> LTAc | 0.53 |
| LTA a,c-->WQBL avg | 1.31 |
| LTA a,c-->WQBL max | 3.11 |
| LTA h --> WQBL max | 2.38 |
| WQBL-limit/report | 2.13 |
| WLA Fraction | 1 |
| WQBL Fraction | 1 |

Conversions:

| | |
|---|---|
| ug/L-->lbs/day Qef | 1.436982 |
| ug/L-->lbs/day Qeo | 0 |
| ug/L-->lbs/day Qr | 1183.905 |
| lbs/day-->ug/L Qeo | 0.695903 |
| lbs/day-->ug/L Qef | 0.695903 |
| diss-->tot 1=y0=n | 1 |
| Cu diss->tot1=y0=n | 1 |
| cfs-->MGD | 0.6463 |

Receiving Stream:

| | |
|---|---|
| Default Hardness= | 25 |
| Default TSS= | 10 |
| 99 Crit., 1=y, 0=n | 1 |
| Old MQL=1, New=0 | 1 |

Toxicity Dilution Series:

| | |
|---|---|
| Biomonitoring dilution: | 0.056025 |
| Dilution Series Factor: | 0.75 |

| | Percent Effluent |
|---|---|
| Dilution No. 1 | 7.470% |
| Dilution No. 2 | 5.6025% |
| Dilution No. 3 | 4.2019% |
| Dilution No. 4 | 3.1514% |
| Dilution No. 5 | 2.3636% |

Partition Coefficients; Dissolved-->Total

| METALS | FW |
|---|---|
| Total Arsenic | 2.223578 |
| Total Cadmium | 3.549121 |
| Chromium III | 5.282524 |
| Chromium VI | 1 |
| Total Copper | 3.56078 |
| Total Lead | 6.6 |
| Total Mercury | 2.785159 |
| Total Nickel | 3.174756 |
| Total Zinc | 4.535534 |

Aquatic Life, Dissolved Metal Criteria, ug/L

| METALS | ACUTE | CHRONIC |
|---|---|---|
| Arsenic | 339.8 | 150 |
| Cadmium | 50.5572 | 1.414322 |
| Chromium III | 779.0334 | 252.7104 |
| Chromium VI | 15.712 | 10.582 |
| Copper | 27.5752 | 17.70626 |
| Lead | 102.5669 | 3.996886 |
| Mercury | 1.734 | 0.012 |
| Nickel | 2032.775 | 225.756 |
| Zinc | 164.4582 | 150.1753 |

Site Specific Multiplier Values:

| | |
|---|---|
| CV = | --- |
| N = | --- |
| WLAa --> LTAa | --- |
| WLAc --> LTAc | --- |
| LTA a,c-->WQBL avg | --- |
| LTA a,c-->WQBL max | --- |
| LTA h --> WQBL max | --- |

| (*1) Toxic Parameters | (*2) Instream Conc. ug/L | (*3) CuEffluent /Tech (Avg) lbs/day | (*4) Effluent /Tech (Max) lbs/day | (*5) MQL ug/L | (*6) 1=No 95% 0=95 % | (*7) Effluent 95th % estimate Non-Tech lbs/day | (*8) Numerical Criteria Acute FW ug/L | (*9) Chronic FW ug/L | (*10) HHDW ug/L | (*11) HH Carcinogen Indicator "C" |
|---|---|---|---|---|---|---|---|---|---|---|
| NONCONVENTIONAL | | | | | | | | | | |
| Total Phenols (4AAP) | | 18.8 | | 5 | 0 | 40.044 | 700 | 350 | 5 | |
| 3-Chlorophenol | | | | 10 | | | | | 0.1 | |
| 4-Chlorophenol | | | | 10 | | | 383 | 192 | 0.1 | |
| 2,3-Dichlorophenol | | | | 10 | | | | | 0.04 | |
| 2,5-Dichlorophenol | | | | 10 | | | | | 0.5 | |
| 2,6-Dichlorophenol | | | | 10 | | | | | 0.2 | |
| 3,4-Dichlorophenol | | | | 10 | | | | | 0.3 | |
| 2,4-Dichlorophenocy-acetic acid (2,4-D) | | | | --- | | | | | 100 | |
| 2-(2,4,5-Trichlorophen-oxy) propionic acid (2,4,5-TP, Silvex) | | | | --- | | | | | 10 | |
| METALS AND CYANIDE | | | | | | | | | | |
| Total Arsenic | | 23.8 | | 10 | 0 | 50.694 | 755.5719 | 333.5367 | 111.1789 | |
| Total Cadmium | | | | 1 | | | 179.4336 | 5.019602 | 35.49121 | |
| Chromium III | | | | 10 | | | 4115.263 | 1334.949 | 264.1262 | |
| Chromium VI | | | | 10 | | | 15.712 | 10.582 | 50 | C |
| Total Copper | | | | 10 | | | 98.18922 | 63.04811 | 3560.78 | |
| Total Lead | | 9.5 | | 5 | 0 | 20.235 | 676.9417 | 26.37945 | 330 | |
| Total Mercury | | 0.62 | | 0.2 | 0 | 1.3206 | 4.829466 | 0.033422 | 5.570319 | |
| Total Nickel | | | | 40 | | | 6453.566 | 716.7203 | | |
| Total Zinc | | 38 | | 20 | 0 | 80.94 | 745.906 | 681.1252 | 22677.67 | |
| Total Cyanide | | | | 20 | | | 45.9 | 5.4 | 663.8 | |
| DIOXIN | | | | | | | | | | |
| 2,3,7,8 TCDD; dioxin | | | 0.00001 | | | | | | 7.1E-007 | C |
| VOLATILE COMPOUNDS | | | | | | | | | | |
| Benzene | | | | 10 | | | 2249 | 1125 | 1.1 | C |
| Bromoform | | 21.7 | | 10 | 0 | 46.221 | 2930 | 1465 | 3.9 | C |
| Bromodichloromethane | | 30.8 | | 10 | 0 | 65.604 | | | 0.2 | C |
| Carbon Tetrachloride | | | | 10 | | | 2730 | 1365 | 0.22 | C |
| Chloroform | | | | 10 | | | 2890 | 1445 | 5.3 | C |
| Dibromochloromethane | | | | 10 | | | | | 0.39 | C |
| 1,2-Dichloroethane | | | | 10 | | | 11800 | 5900 | 0.36 | C |
| 1,1-Dichloroethylene | | | | 10 | | | 1160 | 580 | 0.05 | C |
| 1,3-Dichloropropylene | | | | 10 | | | 606 | 303 | 9.86 | |
| Ethylbenzene | | | | 10 | | | 3200 | 1600 | 2390 | |
| Methyl Chloride | | 79.3 | | 50 | 0 | 168.909 | 55000 | 27500 | | |
| Methylene Chloride | | | | 20 | | | 19300 | 9650 | 4.4 | C |
| 1,1,2,2-Tetrachloro-ethane | | | | 10 | | | 932 | 466 | 0.16 | C |

Appendix B-1 Page 3
Mosaic Fertilizer, LLC - Uncle Sam Plant
LA0004847, AI2532

| (*1) | (*12) | (*13) | (*14) | (*15) | (*16) | (*17) | (*18) | (*19) | (*20) | (*21) | (*22) | (*23) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Toxic | WLAa | WLAc | WLAh | LTAa | LTAc | LTAh | Limiting | WQBL | WQBL | WQBL | WQBL | Need |
| Parameters | Acute | Chronic | HHDW | Acute | Chronic | HHDW | A,C,HH | Avg | Max | Avg | MaxWQBL? | |
| | | | | | | | | 001 | 001 | 001 | 001 | |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | lbs/day | lbs/day | |
| NONCONVENTIONAL | | | | | | | | | | | | |
| Total Phenols (4AAP) | 13124.43 | 62472.13 | 2667.377 | 4199.817 | 33110.23 | 2667.377 | 2667.377 | 2667.377 | 6348.358 | 3832.973 | 9122.476 | no |
| 3-Chlorophenol | --- | --- | 53.34754 | --- | --- | 53.34754 | 53.34754 | 53.34754 | 126.9672 | 76.65946 | 182.4495 | no |
| 4-Chlorophenol | 7180.936 | 34270.43 | 53.34754 | 2297.9 | 18163.33 | 53.34754 | 53.34754 | 53.34754 | 126.9672 | 76.65946 | 182.4495 | no |
| 2,3-Dichlorophenol | --- | --- | 21.33902 | --- | --- | 21.33902 | 21.33902 | 21.33902 | 50.78686 | 30.66378 | 72.9798 | no |
| 2,5-Dichlorophenol | --- | --- | 266.7377 | --- | --- | 266.7377 | 266.7377 | 266.7377 | 634.8358 | 383.2973 | 912.2476 | no |
| 2,6-Dichlorophenol | --- | --- | 106.6951 | --- | --- | 106.6951 | 106.6951 | 106.6951 | 253.9343 | 153.3189 | 364.899 | no |
| 3,4-Dichlorophenol | --- | --- | 160.0426 | --- | --- | 160.0426 | 160.0426 | 160.0426 | 380.9015 | 229.9784 | 547.3485 | no |
| 2,4-Dichlorophenocy-acetic acid (2,4-D) | --- | --- | 53347.54 | --- | --- | 53347.54 | 53347.54 | 53347.54 | 126967.2 | 76659.46 | 182449.5 | no |
| 2-(2,4,5-Trichlorophen-oxy) propionic acid (2,4,5-TP, Silvex) | --- | --- | 5334.754 | --- | --- | 5334.754 | 5334.754 | 5334.754 | 12696.72 | 7665.946 | 18244.95 | no |
| METALS AND CYANIDE | | | | | | | | | | | | |
| Total Arsenic | 14166.35 | 59533.57 | 59311.22 | 4533.233 | 31552.79 | 59311.22 | 4533.233 | 5938.536 | 14098.36 | 8533.569 | 20259.08 | no |
| Total Cadmium | 3364.234 | 895.9578 | 18933.69 | 1076.555 | 474.8576 | 18933.69 | 474.8576 | 622.0635 | 1476.807 | 893.8941 | 2122.145 | no |
| Chromium III | 77157.8 | 238277.4 | 140904.8 | 24690.5 | 126287 | 140904.8 | 24690.5 | 32344.55 | 76787.45 | 46478.54 | 110342.2 | no |
| Chromium VI | 294.5871 | 1888.8 | 68833.87 | 94.26788 | 1001.064 | 68833.87 | 94.26788 | 123.4909 | 293.1731 | 177.4542 | 421.2845 | no |
| Total Copper | 1840.967 | 11253.57 | 1899589 | 589.1096 | 5964.392 | 1899589 | 589.1096 | 771.7335 | 1832.131 | 1108.967 | 2632.739 | no |
| Total Lead | 12692.1 | 4708.515 | 176046.9 | 4061.473 | 2495.513 | 176046.9 | 2495.513 | 3269.122 | 7761.045 | 4697.669 | 11152.48 | no |
| Total Mercury | 90.54854 | 5.965538 | 2971.628 | 28.97553 | 3.161735 | 2971.628 | 3.161735 | 4.141873 | 9.832996 | 5.951797 | 14.12984 | no |
| Total Nickel | 120999.1 | 127928.7 | --- | 38719.71 | 67802.21 | --- | 38719.71 | 50722.82 | 120418.3 | 72887.77 | 173038.9 | no |
| Total Zinc | 13985.13 | 121575.3 | 1.2E+007 | 4475.24 | 64434.9 | 1.2E+007 | 4475.24 | 5862.565 | 13918 | 8424.4 | 19999.91 | no |
| Total Cyanide | 860.5874 | 963.8558 | 354121 | 275.388 | 510.8436 | 354121 | 275.388 | 360.7582 | 856.4566 | 518.4031 | 1230.713 | no |
| DIOXIN | | | | | | | | | | | | |
| 2,3,7,8 TCDD; dioxin | --- | --- | 0.000977 | --- | --- | 0.000977 | 0.000977 | 0.000977 | 0.002326 | 0.001405 | 0.003343 | no |
| VOLATILE COMPOUNDS | | | | | | | | | | | | |
| Benzene | 42166.91 | 200803.3 | 1514.345 | 13493.41 | 106425.7 | 1514.345 | 1514.345 | 1514.345 | 3604.142 | 2176.087 | 5179.087 | no |
| Bromoform | 54935.1 | 261490.5 | 5369.042 | 17579.23 | 138590 | 5369.042 | 5369.042 | 5369.042 | 12778.32 | 7715.217 | 18362.22 | no |
| Bromodichloromethane | --- | --- | 275.3355 | --- | --- | 275.3355 | 275.3355 | 275.3355 | 655.2985 | 395.6522 | 941.6521 | no |
| Carbon Tetrachloride | 51185.26 | 243641.3 | 302.869 | 16379.28 | 129129.9 | 302.869 | 302.869 | 302.869 | 720.8283 | 435.2174 | 1035.817 | no |
| Chloroform | 54185.13 | 257920.7 | 7296.391 | 17339.24 | 136698 | 7296.391 | 7296.391 | 7296.391 | 17365.41 | 10484.78 | 24953.78 | no |
| Dibromochloromethane | --- | --- | 536.9042 | --- | --- | 536.9042 | 536.9042 | 536.9042 | 1277.832 | 771.5217 | 1836.222 | no |
| 1,2-Dichloroethane | 221240.3 | 1053102 | 495.6039 | 70796.91 | 558143.9 | 495.6039 | 495.6039 | 495.6039 | 1179.537 | 712.1739 | 1694.974 | no |
| 1,1-Dichloroethylene | 21749.05 | 103525.2 | 68.83387 | 6959.696 | 54868.38 | 68.83387 | 68.83387 | 68.83387 | 163.8246 | 98.91304 | 235.413 | no |
| 1,3-Dichloropropylene | 11362 | 54083.02 | 5260.068 | 3635.841 | 28664 | 5260.068 | 3635.841 | 4762.952 | 11307.47 | 6844.276 | 16248.63 | no |
| Ethylbenzene | 59997.38 | 285586.9 | 1275006 | 19199.16 | 151361.1 | 1275006 | 19199.16 | 25150.9 | 59709.39 | 36141.39 | 85801.32 | no |
| Methyl Chloride | 1031205 | 4908525 | --- | 329985.6 | 2601518 | --- | 329985.6 | 432281.1 | 1026255 | 621180.2 | 1474710 | no |
| Methylene Chloride | 361859.2 | 1722446 | 6057.381 | 115794.9 | 912896.4 | 6057.381 | 6057.381 | 6057.381 | 14416.57 | 8704.347 | 20716.35 | no |
| 1,1,2,2-Tetrachloro-ethane | 17474.24 | 83177.18 | 220.2684 | 5591.756 | 44083.91 | 220.2684 | 220.2684 | 220.2684 | 524.2388 | 316.5217 | 753.3217 | no |

Appendix B-1
Mosaic Fertilizer, LLC - Uncle Sam Plant
LA0004847, AI2532



| (*1) | (*2) | (*3) | (*4) | (*5) | (*6) | (*7) | (*8) | (*9) | (*10) | (*11) |
|---|---|---|---|---|---|---|---|---|---|---|
| Toxic | Cu | Effluent | Effluent | MQL | Effluent | 95th % | Numerical Criteria | | | HH |
| Parameters | Instream | /Tech | /Tech | | 1=No 95% | estimate | Acute | Chronic | HHDW | Carcinogen |
| | Conc. | (Avg) | (Max) | | 0=95 % | Non-Tech | FW | FW | | Indicator |
| | ug/L | lbs/day | lbs/day | ug/L | | lbs/day | ug/L | ug/L | ug/L | "C" |
| VOLATILE COMPOUNDS (cont'd) | | | | | | | | | | |
| Tetrachloroethylene | | | | 10 | | | 1290 | 645 | 0.65 | C |
| Toluene | | | | 10 | | | 1270 | 635 | 6100 | |
| 1,1,1-Trichloroethane | | | | 10 | | | 5280 | 2640 | 200 | |
| 1,1,2-Trichloroethane | | | | 10 | | | 1800 | 900 | 0.56 | C |
| Trichloroethylene | | | | 10 | | | 3900 | 1950 | 2.8 | C |
| Vinyl Chloride | | | | 10 | | | | | 1.9 | C |
| ACID COMPOUNDS | | | | | | | | | | |
| 2-Chlorophenol | | | | 10 | | | 258 | 129 | 0.1 | |
| 2,4-Dichlorophenol | | | | 10 | | | 202 | 101 | 0.3 | |
| BASE NEUTRAL COMPOUNDS | | | | | | | | | | |
| Benzidine | | | | 50 | | | 250 | 125 | 0.00008 | C |
| Hexachlorobenzene | | | | 10 | | | | | 0.00025 | C |
| Hexachlorabutadiene | | | | 10 | | | 5.1 | 1.02 | 0.09 | C |
| PESTICIDES | | | | | | | | | | |
| Aldrin | | | | 0.05 | | | 3 | | 0.00004 | C |
| Hexachlorocyclohexane (gamma BHC, Lindane) | | | | 0.05 | | | 5.3 | 0.21 | 0.11 | C |
| Chlordane | | | | 0.2 | | | 2.4 | 0.0043 | 0.00019 | C |
| 4,4'-DDT | | | | 0.1 | | | 1.1 | 0.001 | 0.00019 | C |
| 4,4'-DDE | | | | 0.1 | | | 52.5 | 10.5 | 0.00019 | C |
| 4,4'-DDD | | | | 0.1 | | | 0.03 | 0.006 | 0.00027 | C |
| Dieldrin | | | | 0.1 | | | 0.2374 | 0.0557 | 0.00005 | C |
| Endosulfan | | | | 0.1 | | | 0.22 | 0.056 | 0.47 | |
| Endrin | | | | 0.1 | | | 0.0864 | 0.0375 | 0.26 | |
| Heptachlor | | | | 0.05 | | | 0.52 | 0.0038 | 0.00007 | C |
| | | | | 1 | | | 2 | 0.014 | | |
| Toxaphene | | | | 5 | | | 0.73 | 0.0002 | 0.00024 | C |
| Other Parameters: | | | | | | | | | | |
| Fecal Col. (col/100ml) | | | | | | | | | | |
| Chlorine | | | | | | | 19 | 11 | | |
| Ammonia | | | | | | | | | | |
| Chlorides | | | | | | | | | | |
| Sulfates | | | | | | | | | | |
| TDS | | | | | | | | | | |

Appendix B-1 Page 5
Mosaic Fertilizer, LLC - Uncle Sam Plant
LA0004847, AI2532

| (*1) | (*12) | (*13) | (*14) | (*15) | (*16) | (*17) | (*18) | (*19) | (*20) | (*21) | (*22) | (*23) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Toxic | WLAa | WLAc | WLAh | LTAa | LTAc | LTAh | Limiting | WQBL | WQBL | WQBL | WQBL | Need |
| Parameters | Acute | Chronic | HHDW | Acute | Chronic | HHDW | A,C,HH | Avg | Max | Avg | Max | WQBL? |
| | | | | | | | | 001 | 001 | 001 | 001 | |
| | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | lbs/day | lbs/day | |
| Tetrachloroethylene | 24186.44 | 115127.2 | 894.8404 | 7739.662 | 61017.43 | 894.8404 | 894.8404 | 894.8404 | 2129.72 | 1285.87 | 3060.369 | no |
| Toluene | 23811.46 | 113342.3 | 3254200 | 7619.667 | 60071.42 | 3254200 | 7619.667 | 9981.764 | 23697.16 | 14343.62 | 34052.4 | no |
| 1,1,1-Trichloroethane | 98995.68 | 471218.4 | 106695.1 | 31678.62 | 249745.7 | 106695.1 | 31678.62 | 41498.99 | 98520.5 | 59633.3 | 141572.2 | no |
| 1,1,2-Trichloroethane | 33748.53 | 160642.6 | 770.9394 | 10799.53 | 85140.59 | 770.9394 | 770.9394 | 770.9394 | 1834.836 | 1107.826 | 2636.626 | no |
| Trichloroethylene | 73121.81 | 348059 | 3854.697 | 23398.98 | 184471.3 | 3854.697 | 3854.697 | 3854.697 | 9174.179 | 5539.13 | 13183.13 | no |
| Vinyl Chloride | --- | --- | 2615.687 | --- | --- | 2615.687 | 2615.687 | 2615.687 | 6225.336 | 3758.695 | 8945.695 | no |
| ACID COMPOUNDS | | | | | | | | | | | | |
| 2-Chlorophenol | 4837.289 | 23025.44 | 53.34754 | 1547.932 | 12203.49 | 53.34754 | 53.34754 | 53.34754 | 126.9672 | 76.65946 | 182.4495 | no |
| 2,4-Dichlorophenol | 3787.335 | 18027.67 | 160.0426 | 1211.947 | 9554.667 | 160.0426 | 160.0426 | 160.0426 | 380.9015 | 229.9784 | 547.3485 | no |
| BASE NEUTRAL COMPOUNDS | | | | | | | | | | | | |
| Benzidine | 4687.295 | 22311.48 | 0.110134 | 1499.934 | 11825.08 | 0.110134 | 0.110134 | 0.110134 | 0.262119 | 0.158261 | 0.376661 | no |
| Hexachlorobenzene | --- | --- | 0.344169 | --- | --- | 0.344169 | 0.344169 | 0.344169 | 0.819123 | 0.494565 | 1.177065 | no |
| Hexachlorabutadiene | 95.62082 | 182.0616 | 123.901 | 30.59866 | 96.49267 | 123.901 | 30.59866 | 40.08425 | 95.16184 | 57.60034 | 136.7459 | no |
| PESTICIDES | | | | | | | | | | | | |
| Aldrin | 56.24754 | --- | 0.055067 | 17.99921 | --- | 0.055067 | 0.055067 | 0.055067 | 0.13106 | 0.07913 | 0.18833 | no |
| Hexachlorocyclohexane (gamma BHC, Lindane) | 99.37066 | 37.48328 | 151.4345 | 31.79861 | 19.86614 | 151.4345 | 19.86614 | 26.02464 | 61.78369 | 37.39694 | 88.78205 | no |
| Chlordane | 44.99803 | 0.767515 | 0.261569 | 14.39937 | 0.406783 | 0.261569 | 0.261569 | 0.261569 | 0.622534 | 0.37587 | 0.89457 | no |
| 4,4'-DDT | 20.6241 | 0.178492 | 0.261569 | 6.599712 | 0.094601 | 0.261569 | 0.094601 | 0.123927 | 0.294208 | 0.178081 | 0.422772 | no |
| 4,4'-DDE | 984.332 | 1874.164 | 0.261569 | 314.9862 | 993.3069 | 0.261569 | 0.261569 | 0.261569 | 0.622534 | 0.37587 | 0.89457 | no |
| 4,4'-DDD | 0.562475 | 1.070951 | 0.371703 | 0.179992 | 0.567604 | 0.371703 | 0.179992 | 0.23579 | 0.559776 | 0.338826 | 0.804387 | no |
| Dieldrin | 4.451056 | 9.941994 | 0.068834 | 1.424338 | 5.269257 | 0.068834 | 0.068834 | 0.068834 | 0.163825 | 0.098913 | 0.235413 | no |
| Endosulfan | 4.12482 | 9.995541 | 250.7335 | 1.319942 | 5.297637 | 250.7335 | 1.319942 | 1.729124 | 4.105021 | 2.484721 | 5.898841 | no |
| Endrin | 1.619929 | 6.693443 | 138.7036 | 0.518377 | 3.547525 | 138.7036 | 0.518377 | 0.679074 | 1.612154 | 0.975818 | 2.316636 | no |
| Heptachlor | 9.749574 | 0.678269 | 0.096367 | 3.119864 | 0.359483 | 0.096367 | 0.096367 | 0.096367 | 0.229354 | 0.138478 | 0.329578 | no |
| Toxaphene | 13.6869 | 0.035698 | 0.330403 | 4.379809 | 0.01892 | 0.330403 | 0.01892 | 0.024785 | 0.058842 | 0.035616 | 0.084554 | no |
| Other Parameters: | | | | | | | | | | | | |
| Fecal Col.(col/100ml) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |
| Chlorine | 356.2344 | 1963.41 | --- | 113.995 | 1040.607 | --- | 113.995 | 149.3335 | 354.5245 | 214.5895 | 509.4453 | no |
| Ammonia | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |
| Chlorides | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |
| Sulfates | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |
| TDS | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |
| | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |
| | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | no |

APPENDIX B-2 LA0004847, AI No. 2532

Documentation and Explanation of Water Quality Screen
and Associated Lotus Spreadsheet

Each reference column is marked by a set of parentheses enclosing a number and asterisk, for example (*1) or (*19). These columns represent inputs, existing data sets, calculation points, and results for determining Water Quality Based Limits for an effluent of concern. The following represents a summary of information used in calculating the water quality screen:

Receiving Water Characteristics:

Receiving Water: Mississippi River
Critical Flow, Qrc (cfs): 141,955
Harmonic Mean Flow, Qrh (cfs): 366,748
Subsegment No.: 070301
Receiving Stream Hardness (mg/L): 153.4
Receiving Stream TSS (mg/L): 32
MZ Stream Factor, Fs: 1/3
Plume distance, Pf: N/A

Effluent Characteristics:

Company: Mosaic Fertilizer, LLC - Uncle Sam Facility
Facility flow, Qe (MGD): 172.3
Effluent Hardness: N/A
Effluent TSS: N/A
Pipe/canal width, Pw: N/A
Permit Number: LA0004847

Variable Definition:
Qrc, critical flow of receiving stream, cfs
Qrh, harmonic mean flow of the receiving stream, cfs
Pf = Allowable plume distance in feet, specified in LAC 33:IX.1115.D
Pw = Pipe width or canal width in feet
Qe, total facility flow , MGD
Fs, stream factor from LAC.33.IX Chapter 11 (1 for harmonic mean flow)
Cu, ambient concentration, ug/L
Cr, numerical criteria from LAC.33.IX.1113, Table 1
WLA, wasteload allocation
LTA, long term average calculations
WQBL, effluent water quality based limit
ZID, Zone of Initial Dilution in % effluent
MZ, Mixing Zone in % effluent

Formulas used in aquatic life water quality screen (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Qe}{(Qrc \times 0.6463 \times Fs + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Static water bodies (in the absence of a site specific dilution):

Discharge from a pipe:

$$\text{Critical Dilution} = \frac{(2.8)\ Pw\ \pi^{1/2}}{Pf}$$

$$WLA = \frac{(Cr-Cu)\ Pf}{(2.8)\ Pw\ \pi^{1/2}}$$

Discharge from a canal:

$$\text{Critical Dilution} = \frac{(2.38)(Pw^{1/2})}{(Pf)^{1/2}}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{1/2}}{2.38\ Pw^{1/2}}$$

Formulas used in human health water quality screen, human health non-carcinogens (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Qe}{(Qrc \times 0.6463 + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Qrc \times 0.6463 \times Cu)}{Qe}$$

Formulas used in human health water quality screen, human health carcinogens (dilution type WLA):

$$\text{Dilution Factor} = \frac{Qe}{(Qrh \times 0.6463 + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Qrh \times 0.6463 \times Cu)}{Qe}$$

Static water bodies in the absence of a site specific dilution (human health carcinogens and human health non-carcinogens):

Discharge from a pipe:

$$\text{Critical Dilution} = \frac{(2.8)\ Pw\ \pi^{1/2}}{Pf}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{*}}{(2.8)\ Pw\ \pi^{1/2}}$$

Discharge from a canal:

$$\text{Critical Dilution} = \frac{(2.38)(Pw^{1/2})}{(Pf)^{1/2}}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{1/2*}}{2.38\ Pw^{1/2}}$$

* Pf is set equal to the mixing zone distance specified in LAC 33:IX.1115 for the static water body type, i.e., lake, estuary, Gulf of Mexico, etc.

If a site specific dilution is used, WLA are calculated by subtracting Cu from Cr and dividing by the site specific dilution for human health and aquatic life criteria.

$$WLA = \frac{(Cr-Cu)}{\text{site specific dilution}}$$

Long Term Average Calculations:
LTAa = WLAa X 0.32
LTAc = WLAc X 0.53
LTAh = WLAh

WQBL Calculations:
Select most limiting LTA to calculate daily max and monthly avg WQBL

If aquatic life LTA is more limiting:
Daily Maximum = Min(LTAa, LTAc) X 3.11
Monthly Average = Min(LTAc, LTAc) X 1.31

If human health LTA is more limiting:
Daily Maximum = LTAh X 2.38
Monthly Average = LTAh

Mass Balance Formulas:

mass (lbs/day): (ug/L) X 1/1000 X (flow, MGD) X 8.34 = lbs/day

$$\text{concentration(ug/L)}: \frac{\text{lbs/day}}{\text{(flow, MGD) X 8.34 X 1/1000}} = \text{ug/L}$$

The following is an explanation of the references in the spreadsheet.

(*1) Parameter being screened.
(*2) Instream concentration for the parameter being screened in ug/L. In the absence of accurate supporting data, the instream concentration is assumed to be zero (0).
(*3) Monthly average effluent or technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
(*4) Daily maximum technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
(*5) Minimum analytical Quantification Levels (MQLs). Established in a letter dated January 27, 1994 from Wren Stenger of EPA Region 6 to Kilren Vidrine of LDEQ and from the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". The applicant must test for the parameter at a level at least as sensitive as the specified MQL. If this is not done, the MQL becomes the application value for screening purposes if the pollutant is suspected to be present

on-site and/or in the waste stream. Units are in ug/l or lbs/day depending on the units of the effluent data.

(*6) States whether effluent data is based on 95th percentile estimation. A "1" indicates that a 95th percentile approximation is being used, a "0" indicates that no 95th percentile approximation is being used.

(*7) 95th percentile approximation multiplier (2.13). The constant, 2.13, was established in memorandum of understanding dated October 8, 1991 from Jack Ferguson of Region 6 to Jesse Chang of LDEQ and included in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". This value is screened against effluent Water Quality Based Limits established in columns (*18) - (*21). Units are in ug/l or lbs/day depending on the units of the measured effluent data.

(*8) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, acute criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.

Hardness Dependent Criteria:

| Metal | Formula |
|---|---|
| Cadmium | $e^{(1.1280[\ln(\text{hardness})] - 1.6774)}$ |
| Chromium III | $e^{(0.8190[\ln(\text{hardness})] + 3.6880)}$ |
| Copper | $e^{(0.9422[\ln(\text{hardness})] - 1.3884)}$ |
| Lead | $e^{(1.2730[\ln(\text{hardness})] - 1.4600)}$ |
| Nickel | $e^{(0.8460[\ln(\text{hardness})] + 3.3612)}$ |
| Zinc | $e^{(0.8473[\ln(\text{hardness})] + 0.8604)}$ |

Dissolved to Total Metal Multipliers for Freshwater Streams (TSS dependent):

| Metal | Multiplier |
|---|---|
| Arsenic | $1 + 0.48 \times TSS^{-0.73} \times TSS$ |
| Cadmium | $1 + 4.00 \times TSS^{-1.13} \times TSS$ |
| Chromium III | $1 + 3.36 \times TSS^{-0.93} \times TSS$ |
| Copper | $1 + 1.04 \times TSS^{-0.74} \times TSS$ |
| Lead | $1 + 2.80 \times TSS^{-0.80} \times TSS$ |
| Mercury | $1 + 2.90 \times TSS^{-1.14} \times TSS$ |
| Nickel | $1 + 0.49 \times TSS^{-0.57} \times TSS$ |
| Zinc | $1 + 1.25 \times TSS^{-0.70} \times TSS$ |

Dissolved to Total Metal Multipliers for Marine Environments (TSS dependent):

| Metal | Multiplier |
|---|---|

| | |
|---|---|
| Copper | $1 + (10^{4.86} \times TSS^{-0.72} \times TSS) \times 10^{-6}$ |
| Lead | $1 + (10^{6.06} \times TSS^{-0.85} \times TSS) \times 10^{-6}$ |
| Zinc | $1 + (10^{5.36} \times TSS^{-0.52} \times TSS) \times 10^{-6}$ |

If a metal does not have multiplier listed above, then the dissolved to total metal multiplier shall be 1.

(*9) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, chronic criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.
Hardness dependent criteria:

| Metal | Formula |
|---|---|
| Cadmium | $e^{(0.7852[\ln(\text{hardness})] - 3.4900)}$ |
| Chromium III | $e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$ |
| Copper | $e^{(0.8545[\ln(\text{hardness})] - 1.3860)}$ |
| Lead | $e^{(1.2730[\ln(\text{hardness})] - 4.7050)}$ |
| Nickel | $e^{(0.8460[\ln(\text{hardness})] + 1.1645)}$ |
| Zinc | $e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$ |

Dissolved to total metal multiplier formulas are the same as (*8), acute numerical criteria for aquatic life protection.

(*10) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, human health protection, drinking water supply (HHDW), non-drinking water supply criteria (HHNDW), or human health non-primarry contact recreation (HHNPCR) (whichever is applicable). A DEQ and EPA approved Use Attainability Analysis is required before HHNPCR is used, e.g., Monte Sano Bayou. Units are specified.

(*11) C if screened and carcinogenic. If a parameter is being screened and is carcinogenic a "C" will appear in this column.

(*12) Wasteload Allocation for acute aquatic criteria (WLAa). Dilution type WLAa is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the acute aquatic numerical criteria for that parameter. Units are in ug/L.
Dilution WLAa formulas for streams:

$$WLAa = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAa formulas for static water bodies:

$$WLAa = (Cr - Cu)/\text{Dilution Factor})$$

Cr represents aquatic acute numerical criteria from column (*8).
If Cu data is unavailable or inadequate, assume Cu=0.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*13) Wasteload Allocation for chronic aquatic criteria (WLAc). Dilution type WLAc is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the chronic aquatic numerical criteria for that parameter. Units are in ug/L.
Dilution WLAc formula:

$$WLAc = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Orc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAc formulas for static water bodies:
WLAc = (Cr-Cu)/Dilution Factor)
Cr represents aquatic chronic numerical criteria from column (*9).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*14) Wasteload Allocation for human health criteria (WLAh). Dilution type WLAh is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the human health numerical criteria for that parameter. Units are in ug/L. Dilution WLAh formula:

$$WLAh = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Orc,Orh \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAh formulas for static water bodies:
WLAh = (Cr-Cu)/Dilution Factor)
Cr represents human health numerical criteria from column (*10).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*15) Long Term Average for aquatic numerical criteria (LTAa). WLAa numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.32. WLAa X 0.32 = LTAa.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*16) Long Term Average for chronic numerical criteria (LTAc). WLAc numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.53. WLAc X 0.53 = LTAc.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*17) Long Term Average for human health numerical criteria (LTAh). WLAh numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 1. WLAc X 1 = LTAh.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*18) Limiting Acute, Chronic or Human Health LTA's. The most limiting LTA is placed in this column. Units are consistent with the WLA calculation.

If standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then the type of limit, Aquatic or Human Health (HH), is indicated.

(*19) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 1.31 to determine the average WQBL ($LTA_{limiting\ aquatic}$ X 1.31 = $WQBL_{monthly\ average}$). If human health criteria was the most limiting criteria then LTAh = $WQBL_{monthly\ average}$. If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then either the human health criteria or the chronic aquatic life criteria shall appear in this column depending on which is more limiting.

(*20) End of pipe Water Quality Based Limit (WQBL) daily maximum in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 3.11 to determine the daily maximum WQBL ($LTA_{limiting\ aquatic}$ X 3.11 = $WQBL_{daily\ max}$). If human health criteria was the most limiting criteria then LTAh is multiplied by 2.38 to determine the daily maximum WQBL ($LTA_{limiting\ aquatic}$ X 2.38 = $WQBL_{daily\ max}$). If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then either the human health criteria or the acute aquatic life criteria shall appear in this column depending on which is more limiting.

(*21) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. The mass limit is determined by using the mass balance equations above. Monthly average WQBL, ug/l/1000 X facility flow, MGD X 8.34 = monthly average WQBL, lbs/day.

(*22) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. Mass limit is determined by using the mass balance equations above. Daily maximum WQBL, ug/l/1000 X facility flow, MGD X 8.34 = daily maximum WQBL, lbs/day.

(*23) Indicates whether the screened effluent value(s) need water quality based limits for the parameter of concern. A "yes" indicates that a water quality based limit is needed in the permit; a "no" indicates the reverse.

# Appendix C

FRESHWATER ACUTE

# BIOMONITORING FREQUENCY RECOMMENDATION AND RATIONALE FOR ADDITIONAL REQUIREMENTS

Permit Number: **LA0004847**
Facility Name: **Mosaic Fertilizer, LLC, Uncle Sam Plant**
Previous Critical Biomonitoring Dilution: **5% (10:1 ACR)**
Proposed Critical Biomonitoring Dilution: **6% (10:1 ACR)**
Outfall Discharge Flow: **172.3 MGD**
Receiving stream 7Q10: **141,955 cfs**
Date of Review: **11/23/09**
Name of Reviewer: **Laura Thompson**

Recommended Frequency by Species:

***Pimephales promelas* (Fathead minnow):** **Once/Quarter**[1]
***Daphnia pulex* (water flea):** **Once/Quarter**[1]

Recommended Dilution Series: **2%, 3 %, 4%, 6%, and 7%**

Number of Tests Performed during previous 5 years by Species:

***Pimephales promelas* (Fathead minnow):** **11**
***Daphnia pulex* (water flea):** **13**
***Ceriodaphnia dubia* (water flea):** **N/A – Testing of species was not required**

Number of Failed Tests during previous 5 years by Species:

***Pimephales promelas* (Fathead minnow):** **No failures on file during the past 5 years**
***Daphnia pulex* (water flea):** **No failures on file during the past 5 years**
***Ceriodaphnia dubia* (water flea):** **N/A – Testing of species was not required**

Failed Test Dates during previous 5 years by Species:

***Pimephales promelas* (Fathead minnow):** **No failures on file during the past 5 years**
***Daphnia pulex* (water flea):** **No failures on file during the past 5 years**
***Ceriodaphnia dubia* (water flea):** **N/A – Testing of species was not required**

Previous TRE Activities: **N/A – No previous TRE Activities**

[1] If there are no lethal effects demonstrated after the first year of quarterly testing, the permittee may certify fulfillment of the WET testing requirements in writing to the permitting authority. If granted, the biomonitoring frequency for the test species may be reduced to not less than once per year for the less sensitive species (usually *Pimephales promelas*) and not less than twice per year for the more sensitive species (usually *Daphnia pulex*). Upon expiration of the permit, the biomonitoring frequency for both species shall revert to once per quarter until the permit is re-issued.

Additional Requirements (including WET Limits) Rationale / Comments Concerning Permitting:

**The Mosaic Fertilizer, LLC, Uncle Sam Plant owns and operates a phosphatic fertilizer manufacturing facility in Uncle Sam, St. James Parish, Louisiana. LPDES Permit LA0004847, effective November 1, 2003, contained acute freshwater biomonitoring as an effluent characteristic of Outfall 001 for *Pimephales promelas* and *Daphnia pulex*. The effluent series consisted of 2%, 3%, 4%, 5%, and 7% concentrations, with 5% being defined as the critical biomonitoring dilution. Testing was to be performed quarterly for both *Pimephales promelas* and *Daphnia pulex*. Data on file indicate that the permittee has complied with the biomonitoring requirements contained in LA0004847 with no toxicity failures in the last five years.**

**It is recommended that freshwater acute biomonitoring be an effluent characteristic of Outfall 001 (discharge of 172.3 mgd) in LA0004847. The effluent biomonitoring dilution series shall be 2%, 3%, 4%, 6%, and 7% concentrations, with the 6% effluent concentration being defined as the critical biomonitoring dilution (the 10:1 Acute-to-Chronic ratio has been implemented). In accordance with the Environmental Protection Agency (Region 6) WET testing frequency acceleration(s), the biomonitoring frequency shall be once per quarter for *Daphnia pulex* and *Pimephales promelas*. If there are no significant lethal effects demonstrated at or below the critical biomonitoring dilution during the first four quarters of testing, the permittee may certify fulfillment of the WET testing requirements to the permitting authority and WET testing may be reduced to not less than once per six months for the more sensitive species (usually *Daphnia pulex*) and not less than once per year for the less sensitive species (usually *Pimephales promelas*) for the remainder of the term of the permit. Upon expiration of the permit, the biomonitoring frequency for both test species shall revert to once per quarter until the permit is re-issued.**

**This recommendation is in accordance with the LDEQ/OES Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, Water Quality Management Plan Volume 3. Version 6 (April 16, 2008), and the Best Professional Judgment (BPJ) of the reviewer.**

# Appendix D

Appendix D

Mixing Zone Temperature Calculation

Company:

Permit number: LA0066257, AI 3732

Appendix: Appendix D

Outfall: Internal Outfall 201

Ta, deg F 85

Ti, deg F 5

Qe, MGD 172.3

Qr, cfs 141,955

MZ = 0.3333

Te,deg F 977.3703 BTU = 53430 x 10E6/hr

Te={Ti*(Qr*MZ*.6463)+(Ti*Qe)+(Ta*Qe)}/Qe

Te= Allowable temperature of effluent deg F

Ta= Ambient temperature of receiving stream, deg F

Ti= Allowable rise in temperature at the edge of the MZ

MZ = Mixing Zone

Qe= Effluent flow rate, MGD

Qr= Receiving stream critical flow rate, cfs

MZ= Mixing Zone Fraction

BTU Conversion:

BTU = ({[(Te-Ta)*Qe*8.34]/24} x 10E6)/hr